

# THE BIOLOGY OF THE WHITE-FACED IBIS IN IDAHO

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The White-faced Ibis in the United States breeds west of the Mississippi River and south of the 45th parallel (A. O. U. 1983), with the majority nesting in the Great Basin states (Ryder 1967). Historically in Idaho, it has been considered a casual summer visitor and irregular breeder (Larrison et al. 1967, Ryder 1967, Burleigh 1972). In this paper we show that while there were very few records of the White-faced Ibis for the state until the early 1960s, numerous active nesting colonies in Idaho are now known. We also document and describe the foraging of thousands of postbreeding ibises on the extensive mudflats of American Falls Reservoir, which, unlike sites described elsewhere (Bray and Klebenow 1988), were used daily throughout late summer.

## STUDY AREAS AND METHODS

We conducted a literature survey for all White-faced Ibis records in Idaho, and contacted biologists and managers at National Wildlife Refuges and state Wildlife Management Areas throughout southern Idaho for information about the ibis. We also used our observations from 20 years combined field experience in southern Idaho.

We made weekly counts of White-faced Ibises from mid-July through September at American Falls Reservoir, Snake River, Idaho, in 1986 and 1987. The southern half of this reservoir lies in Bannock and Power counties, the northern half in Bingham County. The reservoir is about 35 km long, 10 km wide at its widest point, and covers approximately 23,490 ha (58,000 acres) at full capacity. It fills an ancient lake bed formed during the Pleistocene Epoch and drained by the Bonneville Flood about 15,000 years ago. Although we censused a variety of areas and habitat types at American Falls Reservoir in conjunction with a shorebird study (unpublished), nearly all White-faced Ibises were found on the extensive mudflats where the Snake River enters the reservoir. These were the Springfield Bottoms, and their shoreline was constantly changing. This shoreline receded 3200 m during the late summer and fall of 1986 and nearly 15 km in the late summer and fall of 1987 because of dropping water levels in the reservoir. The Springfield Bottoms' shore length varied from 2 to several km, increasing as the reservoir receded. It became dissected into many areas by the braiding of the Snake River channel and lesser streams at lower water levels. The substrate was a very soft and deep mud (researchers consistently sank from mid-calf to mid-thigh near the shore's edge). We sampled invertebrates, which we preserved in 10% formalin or 80% ethanol, by taking cores 10 cm deep. They were then sorted by sieving (0.82-mm mesh) and identified down to genus with a binocular dissecting scope. We recorded ibis behavior in instantaneous scans

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38 times for 7 and 13 days, respectively, in 1986 and 1987. The times of these scans we picked somewhat arbitrarily, but scans were taken during all hours of day light.

### HISTORICAL RECORDS

The White-faced Ibis was rarely recorded in Idaho until the late 1960s (Tables 1 and 2). Larrison et al. (1967) and Burleigh (1972) both considered it a casual visitor that might breed in the southern part of the state. It is possible that at least moderate breeding colonies have existed periodically in the state since its settlement by Europeans. The lack of records could be due to the nomadic nature of this ibis (Palmer 1962, Ryder 1967) and because few ornithologists worked in areas presently known to harbor colonies (Figure 1). However, the few early studies done indicate that White-faced Ibis were not common early in the state's history.

The only ornithologist to visit potential colony sites in Idaho during the 19th century (Merriam 1873, 1891) did not find any White-faced Ibises. The one probable early breeding record was at Minidoka (Figure 1), where Kenagy (1914) found the species abundant in 1911 and 1912 in the marshes behind the recently built Minidoka Dam. However, Davis (1935) failed to record it at the same location in the years 1919-1921 and saw just one bird in 1934. Levy (1950) found the ibis to be an uncommon late summer visitor during his travels throughout southern Idaho in 1949. It was not recorded at Gray's Lake National Wildlife Refuge (NWR) for three summers in the 1950s (Steel and Bizeau 1956), and only one was recorded in 1961 at Camas NWR (Oring 1962).

### BREEDING RECORDS

Definitely breeding White-faced Ibis were first found in Idaho in 1963 at Minidoka NWR (Wilbur 1976, USFWS 1985). Since the late 1970s colonies of up to a few hundred pairs have been found at several locations in southeastern Idaho (Table 1, Figure 1), and this species has become increasingly common. The 1600 breeding pairs at Bear Lake NWR, Market Lake, and Oxford Slough in 1984 (Table 1) represent a little over 20% of the estimated Great Basin population of 7500 pairs in that year (USFWS 1985). We have no data since that year for two of these areas, but the Bear Lake NWR population has grown in the ensuing years (Table 1), with a peak of 2600 in 1986. Southern Idaho has thus supported a large proportion of the country's breeding White-faced Ibis during the 1980s.

### POSTBREEDING CONCENTRATIONS AT AMERICAN FALLS RESERVOIR

Nonbreeding White-faced Ibis in Idaho have been found from April to October, but all flocks of over 100 birds have been found in late summer or early fall (Table 2). Most of the large nonbreeding concentrations of White-faced Ibises have occurred at American Falls Reservoir (Table 2, Figure 2). In 1986 several hundred birds used these mudflats throughout August, and the population peaked at about 1600 in early September (Figure 2). The ibises'

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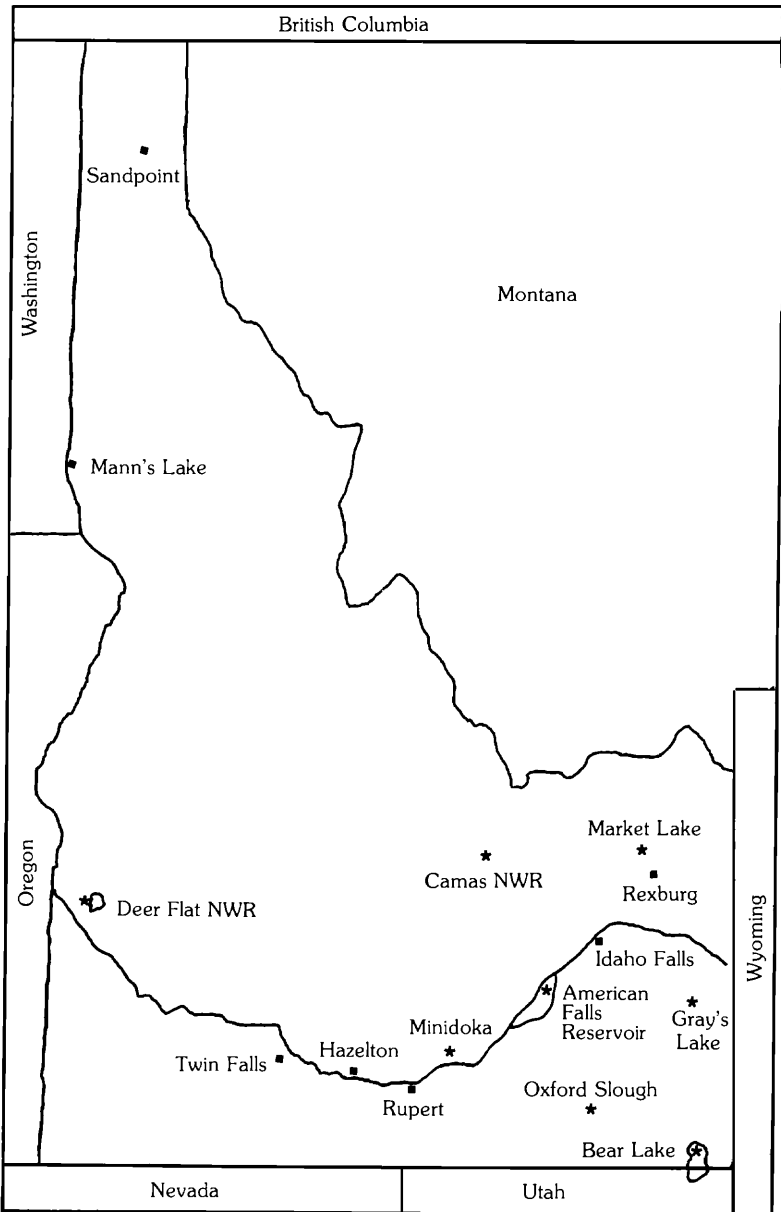


Figure 1. Locations where White-faced Ibises have been found in Idaho. There are also records near many of these locations. Asterisks, known or strongly suspected breeding colonies; squares, nonbreeding localities.

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appearance that year coincided with the first exposure of mud by drawdown of the reservoir. In 1987 ibis numbers increased from several hundred in early July to a peak of 7400 in mid-August. There were at least 1000 ibises consistently using the mudflat from mid-July to early September, except during one count in early August (Figure 2). On that day large flocks were seen leaving the mudflat at dawn as we arrived to census. These counts do not represent all of the ibises using the reservoir since other areas with large mudflats, in particular the mouth of the Portneuf River, were not accessible to us during the two years.

**Table 1** Breeding Records of the White-faced Ibis in Idaho

Location	Year	Number	Source*
American Falls	1979	400?	USFWS 1985
	1980	100 +	AB 34:797, 1980
	1983	200 pairs	C. H. Trost (unpubl.)
Bear Lake NWR	1979	175 pairs	G. Deutscher (unpubl.)
	1980	120 pairs	G. Deutscher (unpubl.)
	1981	189 pairs	G. Deutscher (unpubl.)
	1982	150 pairs	G. Deutscher (unpubl.)
	1983	275 pairs	G. Deutscher (unpubl.)
	1984	700 pairs	G. Deutscher (unpubl.)
	1985	810 pairs	G. Deutscher (unpubl.)
	1986	2600 pairs	G. Deutscher (unpubl.)
Camas NWR	1977	209 pairs	USFWS 1985
	1978	209 pairs	USFWS 1985
	1980	16 adults	J. Richardson (unpubl.)
	1983	40 adults	J. Richardson (unpubl.)
	1986	50 adults	J. Richardson (unpubl.)
Deer Flat NWR	1970s	?	USFWS 1985
Gray's Lake NWR	1972	20 pairs	AB 27:91, 1972
	1973	20 pairs	USFWS 1985
	1986-7	?	E. Barney (unpubl.)
Market Lake NWR	1973-7	15 pairs	USFWS 1985
	1979	Substantial	AB 33:196, 1979
	1981	141 + young	C. H. Trost (unpubl.)
	1983	200 pairs	C. H. Trost (unpubl.)
	1984	458 pairs	USFWS 1985
Minidoka NWR	1963	23 nests	USFWS 1985
	1964	20 nests	S. R. Wilbur 1976
	1965	20 nests	R. A. Ryder 1967
	1977	15 nests	L. Peterson (unpubl.)
Oxford Slough	1977	150 pairs	USFWS 1985
	1979	150 pairs	USFWS 1985
	1983	125 pairs	C. H. Trost (unpubl.)
	1984	470 pairs	USFWS 1985

\*AB, *American Birds*.

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Because of drought in 1987, American Falls Reservoir never filled completely, unlike the previous year, and mudflats remained exposed through the summer. The reservoir experienced a large late-summer drawdown both years, but the 18 km of mudflat exposed in 1987 was far greater than the 3.2 km exposed in 1986. The earlier exposure of mud and greater degree of drawdown in 1987 may help explain the greater numbers of birds in that year. The drought of 1987 may have ruined other feeding areas, causing more birds to congregate at the reservoir.

At the Springfield Bottoms mudflats small to moderate (<100) flocks of White-faced Ibises would arrive and leave throughout the day, flock sizes similar to those observed in Nevada (Bray 1987). There were large numbers of birds on the mudflats throughout the day. The ibises concentrated along the main shoreline of the reservoir but were also found in nearby ephemeral pools, sloughs, and channels of feeder streams. The ibises either waded in shallow water or walked on the mud.

White-faced Ibises fed constantly while on the mudflats. The periodic scan-samples found ibises feeding 96% (7792/8106) of the time. Only 4% (314/8106) were preening or resting. Observations of individual birds that were preening or resting revealed that they usually soon returned to feeding. We never witnessed any agonistic interactions or kleptoparasitism between ibises.

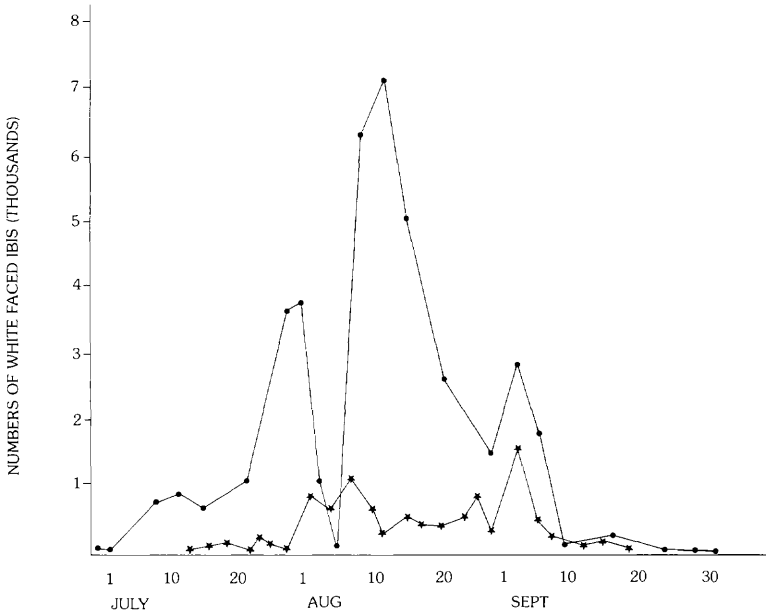


Figure 2. The number of White-faced Ibises on the extensive mudflats where the Snake River enters American Falls in 1986 (dots) and 1987 (small stars).

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Sixty-four mud samples for invertebrates were taken on the Springfield Bottoms mudflats in both years. Total densities of invertebrates ranged from about 6000 to 25,000 per square meter during late summer. Only two invertebrate genera were common, the larva of a chironomid fly and a small (2-4 cm long, 1-2 mm diameter) oligochaete worm. We do not know if the ibises concentrated on one or both of these prey, but they are known to eat similar animals (Palmer 1962, Bray and Klebenow 1988).

**Table 2** Nonbreeding Records of the White-faced Ibis in Idaho

Location	Year	Number	Source <sup>a</sup>
American Falls <sup>b</sup>	May 1968	Small groups	Pitcher (1968)
	Aug 1978	800	AB 33:196, 1979
	Aug 1979	97	AB 34:182, 1980
	Sep 1982	40	D. M. Taylor (unpubl.)
	Sep 1983	383	D. M. Taylor (unpubl.)
Burley	Aug 1986	346	D. M. Taylor (unpubl.)
	Aug 1987	40	D. M. Taylor (unpubl.)
Camas NWR	1960s	Small groups	Ryder (1967)
Deer Flat NWR	Jun 1932	?	Burleigh (1972)
	Aug 1950	450	AFN 4:253, 1950
	1951	?	AFN 5:30, 1951
	1961	Common	Ryder (1967)
	May 1978	15	AB 32:1033, 1978
	Aug 1979	75	AB 34:182, 1980
Hazelton	1949	Uncommon	Levy (1950)
Idaho Falls	Aug 1987	20	D. M. Taylor (unpubl.)
Mann's Lake	Aug 1977	1	AB 34:911, 1980
	May 1987	2	AB 41:463, 1987
Minidoka NWR	1909	Rare	Kenagy (1914)
	1910-1	Common	Kenagy (1914)
	1912-3	Abundant	Kenagy (1914)
	Jun 1934	1	Davis (1935)
	Jul 1958	2	Burleigh (1972)
	Apr 1974	11	AB 28:828, 1974
	Aug 1974	28	AB 29:89, 1975
	Sep 1976	45	AB 31:200, 1977
	May 1977	62	AB 31:1024, 1977
	May 1979	50	AB 32:1033, 1979
	1980	15-25	USFWS (1985)
Rexburg	Jul 1977	50	AB 31:1162, 1977
Sandpoint	Oct 1909	1	Sloanaker (1925)
Twin Falls	May 1979	1	Brown (1981)

<sup>a</sup>AB, *American Birds*; AFN, *Audubon Field Notes*.

<sup>b</sup>Does not include 1986 and 1987, see Figure 2.

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The consistent daily use of the Springfield Bottoms mudflats throughout the late summer in both years varies dramatically from the patterns found in the other major study of the White-faced Ibis' foraging (Bray and Klebenow 1988) and our own limited observations at other locations in southeastern Idaho. Bray and Klebenow (1988), in the Lahontan Valley, Nevada, found these birds using recently flooded agricultural fields, primarily of alfalfa, for only one or two days while the soil was soft and muddy from irrigation. Our observations of feeding ibises in Idaho away from American Falls Reservoir were in flooded fields and pastures or rarely marshes where birds also fed for only one or a few days. The very large concentration of ibises at American Falls Reservoir was probably due to the constant supply of food in a soft, muddy substrate, which was continually being renewed as the reservoir's water level dropped. Such a favorable food supply in late summer would be highly sought by ibises to replenish fat reserves, which are reduced 70% during the breeding season (Capen and Leikers 1979), and to prepare for fall migration.

### CAUSES OF RECENT POPULATION INCREASES IN IDAHO

The recent increase of White-faced Ibises in southeastern Idaho may be due to excessive flooding of the major colonies in Utah caused by the Great Salt Lake rising in the early and mid 1980s (G. Deutscher pers. comm.). This flooding was thought possibly to explain the recent increase of ibises at Lahontan Valley, Nevada (Bray 1987), and would be consistent with the recent increases of this ibis at Malheur NWR in southeastern Oregon (Ivey et al. 1988) and an extralimital breeding record in Iowa (Dinsmore and Dinsmore 1987).

Another explanation is that White-faced Ibis population have increased greatly in the last decade, allowing this species to colonize new areas. The White-faced Ibis population in northern Utah approximately doubled in the late 1970s (Steele 1984), and populations at Malheur NWR have also been very productive recently (Ivey et al. 1988). This increase could be due to the higher water levels and flooding of the early 1980s in the Great Basin and/or recovery from reduced productivity in the 1970s caused by DDT and its residuals (Capen 1977, Steele 1984). Another possibility is that ibis populations in Idaho naturally fluctuate greatly and chaotically, and past peaks were unrecorded because of the lack of observers.

### CONCLUSIONS

This nomadic species' population fluctuates between years and colonies (USFWS 1985) and has decreased drastically enough in the past for this ibis to be considered eligible for the United States Endangered Species List (G. B. Herron pers. comm. to Bray 1987). Because of this, the several areas in southeastern Idaho known to be heavily used by the White-faced Ibis need to be protected and managed for them. One important management act would be to have water drawn down at American Falls Reservoir early enough to expose mudflats at the Springfield Bottoms by early July. Management for this species in Idaho would increase the overall population and in-

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crease the likelihood of survival of the Great Basin population if disaster strikes the traditional large populations of the Great Salt Lake, Malheur NWR, and the Lahontan Valley (USFWS 1985).

### SUMMARY

There are few records and no confirmed breeding of White-faced Ibis in Idaho before the early 1960s, although this may be due to lack of observers. Numbers of birds have increased greatly since then, and in the 1980s a significant portion of the United States population nested in Idaho, including over 20% of the Great Basin population in 1984. Thousands of post-breeding White-faced Ibises congregated in late summer of 1986 and 1987 where the Snake River enters American Falls Reservoir. Here they fed throughout the day on the extensive mudflats, apparently capturing chironomid larvae and/or small oligochaetes.

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